Missing Elements in the Discussion of DCM

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MISSING ELEMENTS

The Genetic Predisposition of DCM

Wider Understanding of Legume Chemistry Upon Nutrition

Deeper Review of Current Feeding Practices

2012

Dr. Google:

"Peas are estrogenic!"

Suggestion:

Impacts Breeding

Reality:

No Science. No Facts. Hypothesis Only.

ALL Foods Followed FDA Nutrient Profiles, Claims, Approved Ingredients & Plant Processing Controls

2017

Major Professor:

“Grain-Free Foods Are Bad!”

Suggests:

Mega-Dose Therapy of Taurine

Response:

Peas Must Be Removed

2018

FDA

July 12, 2018

The U.S. Food and Drug Administration is alerting pet owners and veterinary professionals about reports of canine dilated cardiomyopathy (DCM) in dogs eating certain pet foods containing peas, lentils, other legume seeds, or potatoes as main ingredients. These reports are unusual because DCM is occurring in breeds not typically genetically prone to the disease. The FDA's Center for Veterinary Medicine and the Veterinary Laboratory Investigation and Response Network, a collaboration of government and veterinary diagnostic laboratories, are investigating this potential association.

Science Begins with a Literature Review

The Genetic Predisposition of DCM

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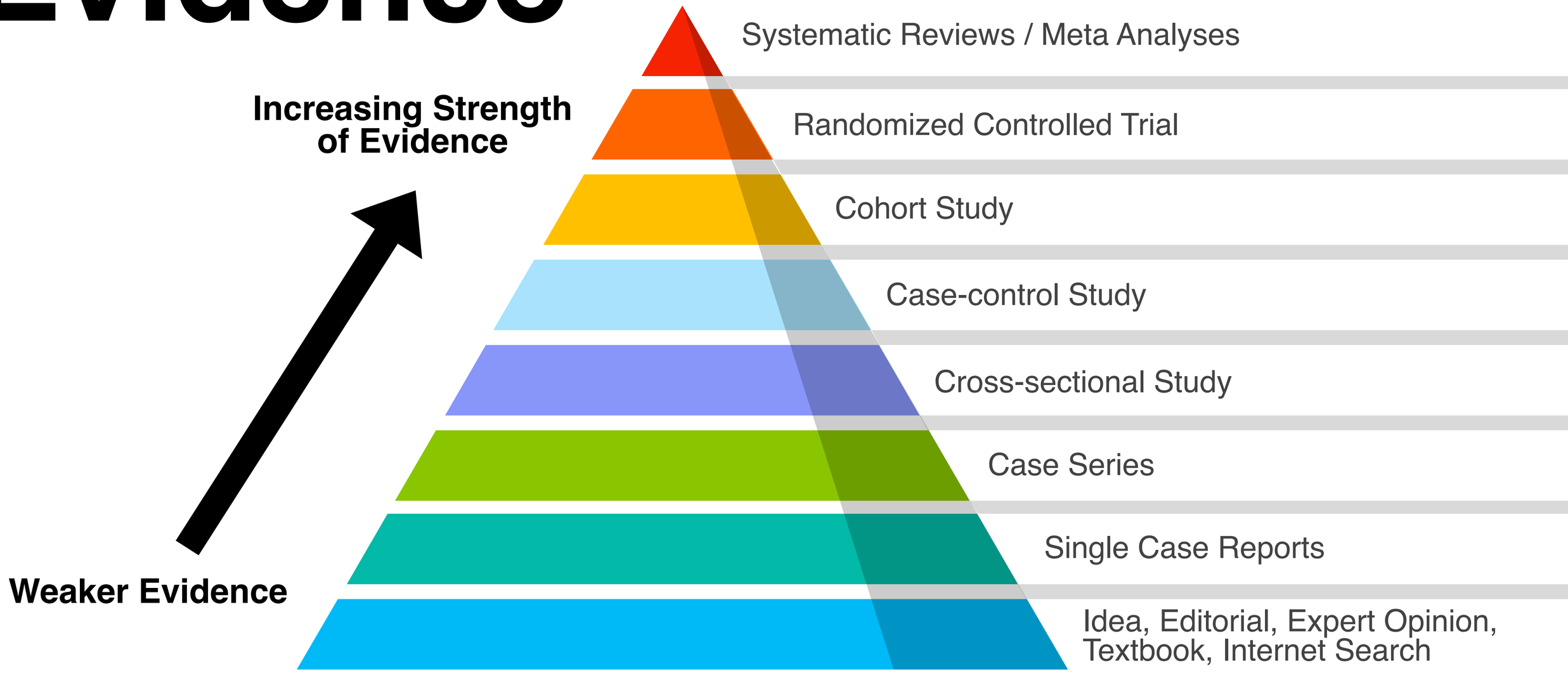
Hierarchy of Scientific Evidence



History of DCM

SISSON

Reported Purdue University Veterinary database showing 1,681 cases in over 340,000 dogs of multiple breeds (0.5%).

1995

1988

FIORETTI

Reported 1.1% DCM in 7,148 dogs of multiple breeds

MUERS

‘DCM was heterogenous disease with an autosomal dominant component.’ 1998 ‘evidence of genetic etiology’

1993

LOJ

Suggested DCM in dogs was an expression of several genes.

2012

2012

PHILLIP

Stated DCM in Irish Wolfhounds is highly prevalent and multiple loci were involved in the pathogenesis of the disease.

LEWIS

Suggested the need for genetic testing to reduce the many health issues in dog breeds due to poor breeding choices.

2012

BELLUMORI

Examined 27,254 mixed and pure-bred dogs to evaluate inherited disorders. Pure-bred dogs were much more likely to have 10 different genetic disorders – including DCM.

2012

2015

OBERBAUER

Reported the ten most inherited conditions (including DCM) in 88,635 dogs.

SIMPSON

Indicated genotypes of multiple loci act together to influence disease. Greater than three loci increases the risk of disease.

2015

Gilliam (2006)

- Sequenced the complete genome of **145 dogs from 69 breeds**
- DCM in the **Standard Schnauzer** was consistent to autosomal recessive
- **753 Standard Schnauzers** were examined - 21 with DCM **(2.8%)**
- **20 of these 21** DCM-dogs had a RBM20 deletion allele - similar to humans with DCM
- All of the other dogs were **DCM-free** and did not have the RBM deletion allele

Rishniw (2011)

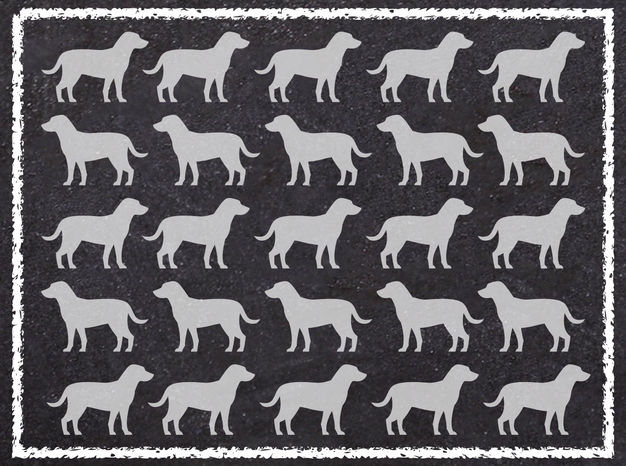
- Completed **genome-wide association studies** (GWAS) to identify several gene candidates for canine heart disease
- Candidate genes (identified in human DCM) failed to identify similar genes in DCM in **Doberman Pinschers**
- There was involvement of a **mitochondrial gene** associated with glucose metabolism (pyruvate dehydrogenase kinase) – not found in human DCM cases

Ito (2012)

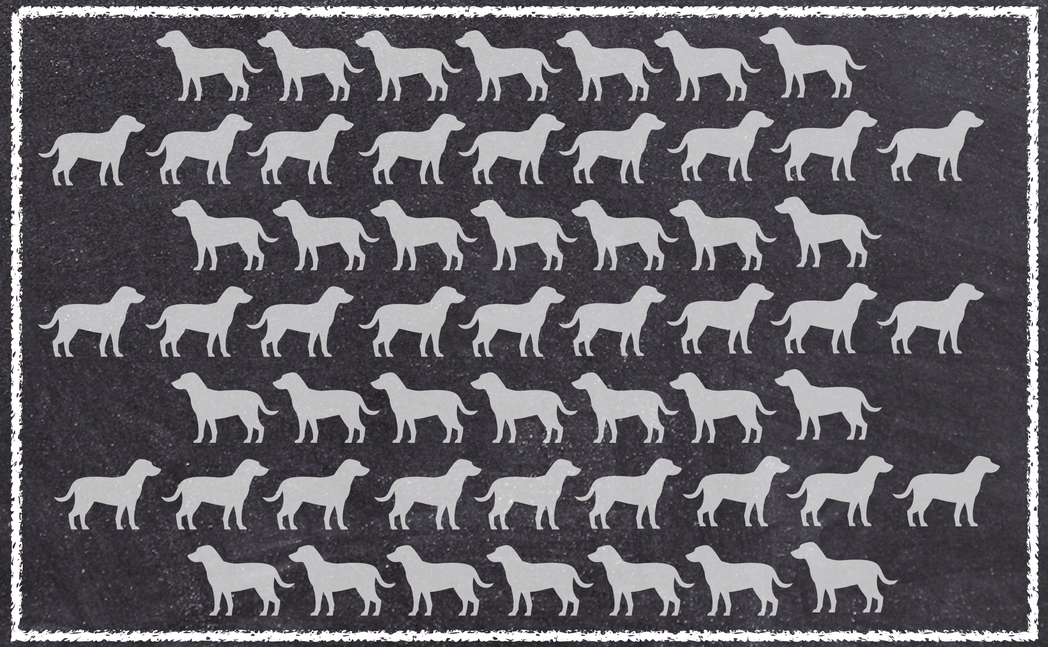
- Reported that the molecular mechanisms of **taurine depletion-related** cardiomyopathy remained unclear
- Mozaffari (1986) demonstrated taurine depletion altered myocardial carbohydrate metabolism
- This involved a **specific protein in the mitochondria** that transformed pyruvate to acetyl-CoA that was identified as pyruvate dehydrogenase kinase identified in DCM genetic evaluations

CNS Research

Over 25 breeds cited meeting "high risk" for DCM



55+ breeds were found in the literature with DCM



Animal Health Trust

Animal Health Trust is endeavoring to uncover genetic relationship with disease due to poor or non-existent breed standards.

Gough (2018)

- Knowledge of genetic factors will allow for enhanced breeding strategies
- Individuals with history of DCM (identified with robust genetics) could be removed from breeding programs
- Bottom Line – Genetic tools are necessary to promote healthier pets

Wider Understanding of Legume Chemistry Upon Nutrition

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LEGUME DEFINITION

- Multi-faceted group of ingredients connected by nitrogen fixing bacteria at the root nodule
- Family Fabacea
- Highly differentiated physically & chemically… and processing conditions vary greatly
- Grain-Free products were equally as diverse with widely variable levels in protein, starch, fat, fiber & minerals

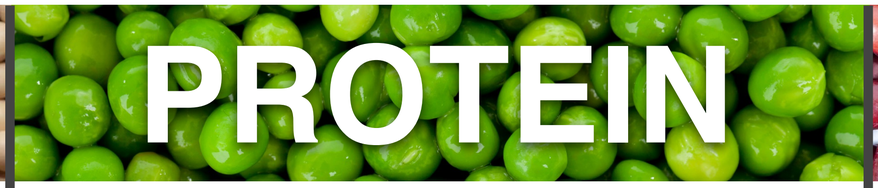
Legume Differences

STARCH

Starch content can vary from 10% - 80%

The expansion or ability to “cook” varies

Some are associated with minerals or proteins



PROTEIN

Protein can range from 0% to 80%

Some are plastic-like & build strong structures

Others are large and amorphous holding water

FIBER

Some have limited binding while others bind widely

Some have high water-holding while others are limited

Some bind metabolites while others don’t

Typical Starch Content

	Wheat	Rice	Barley	Pea	Kidney Bean	Lentils	Potato	Sweet Potato
IDF	5.4	2.1	10.7	16.7	14.9	18.0	3.9	3.1
SDF	2.9	0.9	4.3	4.7	2.3	2.8	5.5	4.4
TDF	8.3	3.0	15.0	21.4	17.2	20.1	9.4	7.5
Total Starch	69.8	81.4	65.6	59.9	58.2	44.4	85.5	87.4
Amylose	25.8	20.7	23.8	33.6	26.8	28.0	20.4	17.4

Deeper Review of Current Feeding Practices

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Nutritional Balance

Only foods follow nutritional principles to be called complete and balanced.

Other edible products do not.

Pet Obesity Is An Issue In Disease

- 40% - 50% of pets are overweight. 18%+ are classically obese.
- Obesity is known to impact many health disorders including being a major factor of DCM in humans.
- Tidholm (1997) described a fatty infiltration – degenerative DCM in Boxers and Dobermans.

Example

5 Dental Bones / week

2 Biscuits / day

5 Rawhide Chips / week

1-2 Soft Moist Treats / day

What A Dog Needs

Balanced Diet

What A Dog Gets

40% - 50%
more calories

IMPACT

Imbalance of key nutrients

Reduces bioavailability of key nutrients

Potential upset of digestive tract

The **overall food regimen** fed today by consumers to their pets

would not meet

the FDA/AAFCO nutrient profiles for complete and balanced.

WHAT COULD SCIENCE HAVE COMMINICATED?

- Literature recognizes DCM as a heritable disease.
- If you are concerned about your pet susceptibility to DCM, consider supplementation.
- We support the development of genetic tools for educated breeding.
- Build a multi-dimensional panel to explore various sciences including:
  - Nutritional Science
  - Statistical Modeling
  - Veterinary Medical Databases
  - Food Science
  - Processing & Food Engineering
  - Insurance Databases
  - Genetics & Genetic Testing
  - Market Information